

ROCKWELL INTERNATIONAL
NORTH AMERICAN SPACE OPERATIONS
P.O. BOX 464
GOLDEN, COLORADO 80401

ANALYTICAL REPORT

GENERAL LABORATORY
BUILDING 881

DISTRIBUTION:

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File

LAB NUMBER: E87-3929
DATE: 12-01-87 ADDENDUM
ACCOUNT NO: 986070

APPROVED:

J. D. Grooms
J. D. Grooms

SAMPLE DESCRIPTION

Third quarter surface water; mound, PAD, trench: SW-27, 28, 50, 51, 52, 53, 55, 56, 57, 58, 59, 60, 61, 62, 63, and 64.

ANALYSIS RESULTS

The attached report contains metals data by Atomic Absorption for the listed third quarter surface waters. This completes the report E87-3929, dated 11-16-87.

ADMIN RECORD

"REVIEWED FOR CLASSIFICATION

By R. B. Hoffman

Date 7-11-90

REVIEWED FOR CLASSIFICATION/UCM

By *George H. Setlock*

Date 7/3/90

A-DU02-000013

METALS BY ATOMIC ABSORPTION SPECTROSCOPY

The following elements were determined by atomic absorption spectroscopy on filtered samples preserved to a pH of less than two with nitric acid as given below:

<u>ELEMENT</u>	<u>DIGESTION</u>	<u>ANALYSIS METHOD</u>
Antimony	None	Furnace; 7041
Arsenic	7060	Furnace; 7060
Beryllium	None	Furnace; 7091
Cadmium	None	Furnace; 7131
Lead	None	Furnace; 7421
Mercury	7470	Cold Vapor; 7470
Potassium	None	Flame; 7610
Selenium	7740	Furnace; 7740
Thallium	None	Furnace; 7840
Cesium	None	Furnace
Lithium	None	Flame

NOTE: The 7000 series methods are methods from the EPA SW-846 methods, September, 1986.

For the results given in Table 3, arsenic, selenium and mercury are reported as Total Dissolved metals as they were determined on the filtered samples following a strong digestion. The results of all the other elements are reported as Dissolved metals as they were determined on the samples without any digestion.

All results are reported using significant figures in milligrams per liter (mg/l) as follows:

a) A number with no letter is a result at or above the quantification limit. The quantification limit is the lowest value reportable having an acceptable degree of accuracy and precision.

b) A number with a modifier J is an estimated value for an element detected, but below the quantification limit of the method.

c) A number with a modifier U indicates analysis of the sample with no detection of the element below the quantification limit and above the instrument detection limit.

Following are the Required Detection Limits (RDL) and the Quantification Limits (QL) of the analysis method of each element determined:

<u>ELEMENT</u>	<u>RDL (MG/L)</u>	<u>QL (MG/L)</u>
Antimony	0.060	0.020
Arsenic	0.010	0.005
Beryllium	0.005	0.005
Cadium	0.005	0.001
Lead	0.005	0.005
Mercury	0.0002	0.0002
Potassium	1.0	0.5
Selenium	0.005	0.005
Thallium	0.010	0.010
Cesium	0.200	0.020
Lithium	0.10	0.10

All samples were analyzed for thallium and none was detected. However, recoveries of a 0.010 mg/l standard sample spike were less than 20 percent. Recoveries of beryllium standard spikes were much greater than 100% indicating a significant enhancement of the analyte by the sample matrix. Even though enhancement of the beryllium signal by the sample matrix was apparent, no beryllium was detected. Correction of these problems is being addressed.

METALS BY ATOMIC ABSORPTION SPECTROSCOPY

SAMPLE ID	SW-27	SW-28	SW-61	SW-62	SW-64
SAMPLE DATE	7-22-87	7-22-87	7-22-87	7-22-87	7-22-87
ELEMENT					
mg/l					
Antimony	0.02U	0.02U	0.02U	0.02U	0.02U
Arsenic	0.005U	0.005U	0.005U	0.005U	0.005U
Beryllium	0.005U	0.005U	0.005U	0.005U	0.005U
Cadium	0.001U	0.001U	0.0007J	0.001U	0.001U
Lead	0.005U	0.005U	0.005U	0.005U	0.005U
Mercury	0.0002U	0.0002U	0.0003	0.0002U	0.0002U
Potassium	3.8	2.0	3.0	1.9	1.3
Selenium	0.005U	0.005U	0.005U	0.002J	0.005U
Thallium	0.01U	0.01U	0.01U	0.01U	0.01U
Cesium	0.02U	0.02U	0.02U	0.02U	0.02U
Lithium	0.03J	0.02J	0.10U	0.08J	0.12

METALS BY ATOMIC ABSORPTION SPECTROSCOPY

SAMPLE ID	SW-63	SW-50	SW-51	SW-52	SW-53
SAMPLE DATE	7-24-87	7-21-87	7-21-87	7-21-87	7-21-87
ELEMENT					
mg/l					
Antimony	0.02U	0.02U	0.02U	0.02U	0.02U
Arsenic	0.003J	0.012	0.007	0.003J	0.003J
Beryllium	0.005U	0.005U	0.005U	0.005U	0.005U
Cadium	0.001U	0.001U	0.001U	0.001U	0.001U
Lead	0.005U	0.005U	0.005U	0.005U	0.005U
Mercury	0.0002U	0.0002U	0.0002U	0.0002U	0.0002U
Potassium	2.2	0.3J	0.6	0.9	3.1
Selenium	0.002J	0.005U	0.005U	0.005U	0.005U
Thallium	0.01U	0.01U	0.01U	0.01U	0.01U
Cesium	0.02U	0.02U	0.02U	0.02U	0.02U
Lithium	0.07J	0.01J	0.01J	0.05J	0.03J

METALS BY ATOMIC ABSORPTION SPECTROSCOPY

SAMPLE ID	SW-55	SW-56	SW-57	SW-58	SW-59
SAMPLE DATE	7-21-87	7-21-87	7-21-87	7-21-87	7-21-87
ELEMENT					
mg/l					
Antimony	0.02U	0.02U	0.02U	0.02U	0.02U
Arsenic	0.005U	0.005U	0.002J	0.002J	0.001J
Beryllium	0.005U	0.005U	0.005U	0.006	0.005U
Cadium	0.001U	0.001U	0.001U	0.001U	0.001U
Lead	0.005U	0.005U	0.005U	0.005U	0.005U
Mercury	0.0002U	0.0005	0.0004	0.0002U	0.0002U
Potassium	1.3	1.9	2.0	0.4J	1.4
Selenium	0.005U	0.002J	0.005U	0.005U	0.002J
Thallium	0.01U	0.01U	0.01U	0.01U	0.01U
Cesium	0.02U	0.02U	0.02U	0.02U	0.02U
Lithium	0.1	0.01J	0.01J	0.02J	0.02J

METALS BY ATOMIC ABSORPTION SPECTROSCOPY

SAMPLE ID	SW-60
SAMPLE DATE	7-21-87
ELEMENT	
mg/l	
Antimony	0.002U
Arsenic	0.005U
Beryllium	0.005U
Cadium	0.001U
Lead	0.005U
Mercury	0.0002U
Potassium	1.4
Selenium	0.005U
Thallium	0.01U
Cesium	0.02U
Lithium	0.01J